

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization International Bureau



(43) International Publication Date
21 October 2004 (21.10.2004)

PCT

(10) International Publication Number
WO 2004/090491 A3

(51) International Patent Classification⁷: **B67C 003/28**, G01F 023/04, G01K 003/14

AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(21) International Application Number:
PCT/US2004/010177

(22) International Filing Date: 30 March 2004 (30.03.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/459,037 31 March 2003 (31.03.2003) US

(71) Applicants (*for all designated States except US*): SAUDI ARABIAN OIL COMPANY [SA/SA]; R-3296, Administration Building, Dhahran 31311 (SA). ARAMCO SERVICES COMPANY [US/US]; 9009 West Loop South, Houston, TX 77096 (US).

(72) Inventor; and

(75) Inventor/Applicant (*for US only*): AL-MISFER, Adel, S. [SA/SA]; Box 755, Udhailiyah, Al-Hassa (SA).

(74) Agent: NATOLI, Anthony, J.; Abelman, Frayne & Schwab, 150 East 42nd Street, New York, NY 10017-5612 (US).

(81) Designated States (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM,

(84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

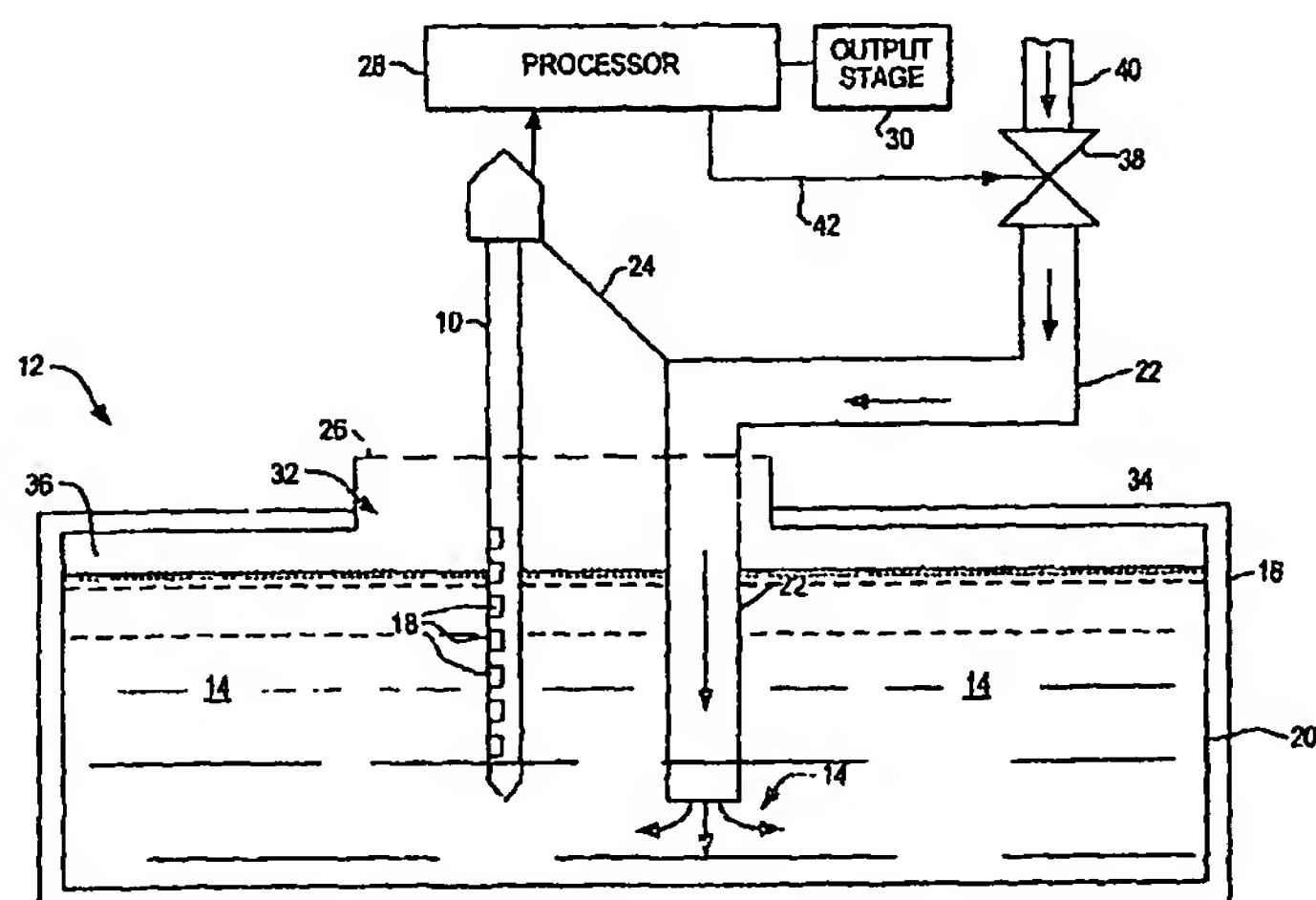
Published:

- *with international search report*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

(88) Date of publication of the international search report:
6 January 2005

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: MEASUREMENT OF MOLTEN SULFUR LEVEL IN RECEPTACLES



WO 2004/090491 A3

of molten sulfur (14) into the tank (16).

(57) Abstract: A portable temperature sensing probe (10) having a plurality of thermocouples (18) is inserted into a tank (16) mounted on a truck or other receptacle at the time of loading a hot liquid, e.g., molten sulfur (14). The probe and at least a portion of the associated wiring or leads are attached to the loading pipe (22) and/or discharge nozzle, and the probe is inserted into the interior of the tank before the molten sulfur (14) is discharged. The signals from the plurality of thermocouples (18) are amplified and the corresponding temperature information is transmitted to a display and control device (30). Due to the significant differential between the temperature of the rising molten sulfur (14) and the vapors in the tank overhead space (26), the signals generated indicate which of the thermocouples (18) are in contact with molten sulfur (14) or the vapor zone (32). The generated signals adjust the shut-off valve (38) that controls the flow